

IPG Photonics' Multi-axis Workcell

from the World Leader in Fiber Lasers



Applications



Features



Advantages



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IPG The Power to Transform®

System Overview

IPG Photonics' Multi-axis Workcell



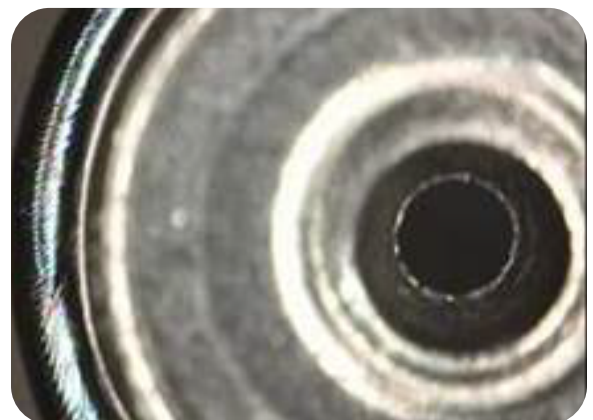
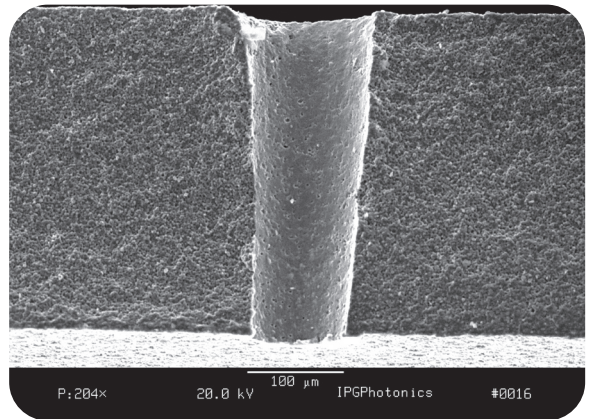
Multi-axis Workcells at a Glance

IPG's Multi-axis Laser Workcell is a highly cost-efficient tool for cutting, drilling and welding a wide range of metal components, enclosures and fabrications. Configurable with our high efficiency CW lasers or our high peak power QCW lasers, the Multi-axis workcell provides fast processing of even highly reflective materials. Featuring rugged industrial construction, the system includes a granite table and superstructure for thermal and mechanical stability. Systems are easily programmed for maximum tool flexibility.

Designed for production parts processing, the Standard Multi-axis Workcell has high-precision stages and X-Y travel of 500 x 300 mm. For customers with smaller parts, the Compact Multi-axis provides a lower-cost solution with a smaller footprint while the Micro machine is a bench-top unit optimized as a production processing workcell for small precision parts. Each system type can be configured for cutting, drilling or welding by choosing the appropriate IPG processing head.

IPG's Multi-axis Workcell is an ideal processing system for manufacturers of medical devices, automotive components, electrical and electronic enclosures /packages and small appliance parts.

The Laser Workcell, fiber laser and laser processing head are designed, manufactured and supported by IPG Photonics – your partner for precision laser processing systems.



Top: Stainless Steel Tube
Middle: 0.1 mm Hole in Aluminum Nitride
Bottom: Nickel Plated Steel Battery Lid



Multi-axis System Applications

- Spot Welding
- Seam Welding
- 2D Cutting
- Tube Cutting
- Via Drilling
- Medical Devices
- Electronic Enclosures
- Electrical Contacts
- Sensors & Transducers
- Automotive Components

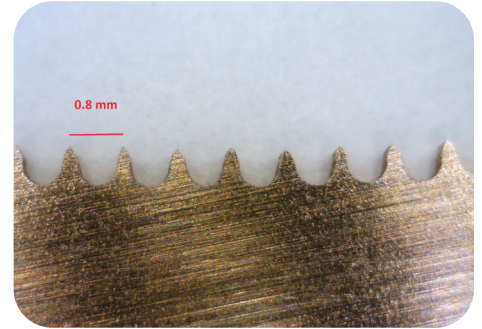
Wide Range of Capabilities

IPG Photonics' Multi-axis Workcell



Cutting & Drilling

IPG's range of lasers and laser processing heads allows configuration of the Multi-axis Workcell for fast cutting of all metals, including steel, aluminum, titanium and highly-reflective materials such as copper and brass. The unit's low-mass head design and high-force motors enable high-speed production cutting while small beam diameters optimize the processing of small intricate parts. When equipped with IPG's QCW high peak power pulsed lasers, the system can be used for high speed drilling with programmable laser parameters enabling processing of metals and ceramics alike.



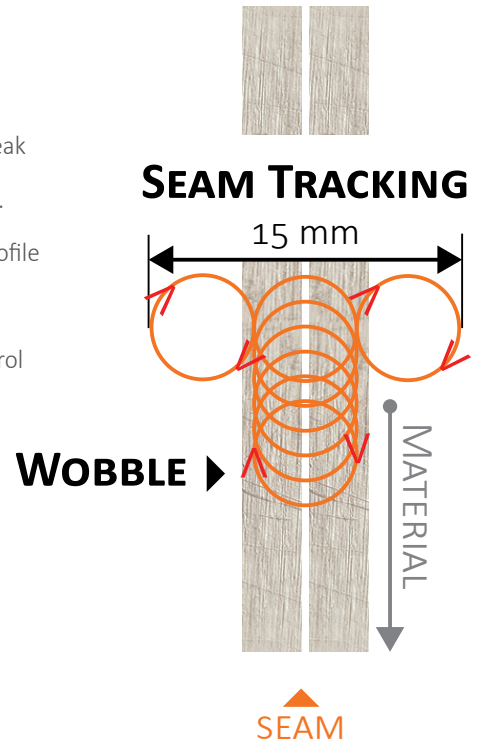
Welding

The precision part positioning of IPG's Multi-axis Workcell combined with the high peak power QCW laser provides a highly flexible welding system compatible with all metal types. The highly efficient QCW lasers feature an adjustable output power with no changes in beam profile or quality, allowing versatility across all applications. The Multi-axis software provides advanced programmability of pulse duration and frequency characteristics with dynamic laser power control providing optimized, repeatable welding quality for all jobs.

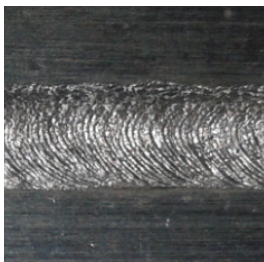


Processing Heads

IPG's D30 and D50 welding heads have a wide range of options for matching beam profile to processing requirements. The heads include on-axis vision systems and programmed control of the process gas. For situations where gaps may be present between parts, IPG's optional Wobble and Seam Tracking Module allows optimum positioning of the beam axis and a wide beam scanning range to increase production process tolerances.



IPG's Wobble Head
Tracks seam position and creates a programmable wide weld width for less precisely fitting parts.



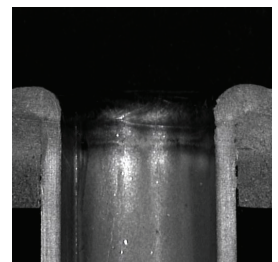
Carbon Steel



Aluminum



Austenitic Stainless Steel



Examples of Wide-seam welding on Aluminum, Carbon Steel and Austenitic Stainless Steel

Multi-axis Workcell

Flexibility in Laser Processing

System Enclosure

- CDRH Class 1 Enclosure with Laser-safe Windows
- Fabricated Steel Construction with Granite Table & Support
- Front Doors- Manual or Automatic Operation
- Access Panels on Front and Sides of Cell for Easy Access and Maintenance

Beam Delivery Options

Cutting & Drilling Head

- IPG's FLC-D30 or MicroCutting Head
- Off-axis Viewing System
- Supports 2 Process Gases

Welding Head

- IPG's FLW-D30 or D50 Welding Head
- Coaxial Viewing System
- Supports One Process Gas
- Optional D50 Wobble Module

User Interface

- Intuitive HMI for Machine Control
- G/M-code Programming
- CAD/CAM Software (Optional)



(L-R) Micro, Compact & Standard Workcells

Workcell Features

	Micro	Compact	Standard
Work Envelope, mm, in.	100 x 100 x 100 4 x 4 x 4 in.	250 x 250 x 200 10 x 10 x 8	500 x 300 x 300 19.6 x 12 x 12
Dimensions, WxDxH, mm, in.	508 x 1067 x 1473 20 x 48 x 58	840 x 1240 x 2230 33 x 49 x 88	1300 x 1600 x 2200 63 x 51 x 87
Max. Laser Power, W	500	500	4000



Part Motion System

- Up to 4-axes of Coordinated Motion
- Linear Stages for High Speed & High Accuracy
- Rotary Motion about X Standard; Additional Rotary Axis Options Available
- Stages are Sealed to Protect against Damage, Contamination and Debris

Laser Power Options

- CW High Efficiency Lasers: 300, 500, 1000, 2000 & 4000 W
- QCW High Peak Power Lasers: 150/1500, 300/3000 & 450/4500 W
- Lasers below 500 W can be Air-cooled & Internally Mounted, Saving Energy & Space; Compact Multi-axis only available with Internally Mounted Lasers (max. power 500 W)



Why IPG's Multi-axis Workcell?

Fast Production Laser Processing

High-force Motion Systems & Low-mass Processing Heads

IPG's Fiber Reliability

No Laser Maintenance
No Mirrors to Clean or Align

Low Operating Costs

Low Facilities Costs
No Chiller Required

Size Matters

As Little as 5.8 square feet of Bench Space

Affordable

The Right-sized Machine for Your Parts

Broad Capabilities

Cut, Weld or Drill Steel, Aluminum & Highly Reflective Metals
with Great Results

Simple Production Implementation

Process Development & Automation by IPG

Single Point Service & Support

Laser & Workstation
Designed, Built & Supported by IPG

Position your Business for Growth with IPG



Company Overview

IPG Photonics' At-a-glance



Leader in Innovation

IPG Photonics is the world leader in high power fiber lasers and amplifiers. Founded in 1990, IPG pioneered the development and commercialization of optical fiber-based lasers for use in a wide range of venues such as materials processing, medical, scientific and other advanced applications. Fiber lasers have revolutionized the industry by delivering superior performance, reliability and usability at a lower cost of ownership compared with conventional lasers, allowing end users to increase productivity and decrease operating costs. IPG is headquartered in Oxford, MA with additional facilities throughout the world.



IPG Photonics World Headquarters, Oxford MA, USA



Service & Support

As the world leader in fiber lasers, IPG Photonics is your ideal partner to provide service and support for your precision laser processing system. IPG has over 100 field service engineers, specializing in servicing industrial lasers and laser systems used in 24x7 manufacturing. North American applications and field service offices are located in Oxford, MA, Santa Clara, CA and Novi, MI. IPG's Field Service Team is comprised of experienced and highly-skilled engineers, supported by a global infrastructure including parts warehousing, applications scientists and the design and manufacturing teams that build the products.

IPG understands the rigors of today's manufacturing line and can provide customer support 24/7 depending on your needs. In addition to warranty coverage, IPG offers support packages ranging from on-demand and hourly paid service to scheduled preventive maintenance and guaranteed response times. Whatever your service preference, IPG has an option that will meet your needs.

System Specifications

IPG Photonics' Multi-axis Workcell

System Specifications

	Standard Workcell	Compact Workcell	Micro Workcell
Laser Power Options, W	CW: 300, 500, 1000, 2000 & 4000 QCW: 150/1500, 300/3000, 450/4500	CW: 300, 500 QCW: 150/1500, 300/3000 & 450/4500	
Beam Delivery-Cutting	IPG's FLC-D30 or FLC Microcutting Head Includes Off-axis Viewing System		
Beam Delivery-Welding	IPG's FLW-D30 or FLW-D50 Weld Head Includes Co-axial Vision & Single Process Gas Support FLW Wobble Module (Optional)	IPG's FLW-D30 Welding Head Includes Co-axial Vision & Single Process Gas Support FLW Wobble Module (Optional)	
Work Envelope, X:Y:Z, mm, in.	500 x 300 x 300 19.6 x 12 x 12	250 x 250 x 200 10 x 10 x 8	100 x 100 x 100 4 x 4 x 4
X-Y-Stage Travel	X: 500 mm, 19.6 in., Y: 300 mm, 12 in.	X: 250 mm, 10 in., Y: 250 mm, 10 in.	X: 100 mm, 4 in., Y: 100 mm, 4 in.
Accuracy	±8 µm (0.31 mils)	±24 µm (1.0 mils)	±30 µm (1.2 mils)
Repeatability	±2 µm (0.08 mils)	±3 µm (0.12 mils)	±5 µm (0.2 mils)
Velocity	1 m/sec (2360 in/min)	100 mm/sec (236 in/min)	25 mm/sec (60 in/min)
X-Y Stage Option (Compact only)		Accuracy: ±12 µm (0.5 mils) Repeatability: ±2 µm (0.08 mils) Velocity: 1 m/sec (2360 in/min)	
Z-Stage Travel	Z: 300 mm (12")	Z: 200 mm (8")	Z: 100 mm, 4"
Accuracy	±25 µm (1.0 mils)	±24 µm (1.0 mils)	
Repeatability	±3 µm (0.12 mils)	±3 µm (0.12 mils)	Manual Operation
Velocity	400 mm/sec (940 in/min)	100 mm/sec (236 in/min)	
Tooling	Aluminum T-slot Table		
Rotation Stage (X-axis): Gear Drive	Travel: 360° Continuous, Speed: 30 rpm max; Accuracy: ±180 arc-sec Repeatability: ±45 arc-sec 5C Collet, 3 Jaw Chuck		
Rotation Stage Options (X-axis): Direct Drive	Travel: 360° Continuous; Speed: 600 rpm max Accuracy ±10 arc-sec; Repeatability ±4 arc-sec Integral, Pneumatic ER25 Collet Chuck	N/A	
Controls/ Interface	Industrial Motion Controller, Full Look-ahead Contouring Capability Laser Power Proportional to Velocity, Windows-based CNC Interface G/M-code Programming, Editable Materials & Laser Parameter Database		
Process Gas	Cutting: Computer Controlled Pressure Regulator Solenoid Valve & Flow Switch for Two Process Gases Welding: Manually Adjustable Pressure Regulator & Computer Controlled Solenoid Valve & Flow Switch for One Process Gas		
Exhaust	4" Bulkhead with Exhaust Plenum for Optional Welding Table		
Safety	CDRH Class I Laser System (Complies with 21 CFR Chapter 1, Subchapter J)		
Dimensions, LxWxH, mm, in.	1600 x 1300 x 2220; 63 x 51 x 87	1260 x 800 x 2200; 50 x 32 x 87	1067 x 508 x 1473; 42 x 20 x 58



Sales & Service ■
 Development, Sales & Service ■
 Manufacturing, Development, Sales & Service ■

IPG Photonics Corporation

World Headquarters
 Oxford, MA USA
 +1 508 373 1100
 sales.us@ipgphotonics.com

IPG Laser GmbH

European Headquarters
 Burbach, DE
 +49 2736 44200
 sales.europe@ipgphotonics.com

IRE- Polus Co.

IPG Russia
 Fryazino, Moscow RU
 +7 (495) 702 95 89
 mail@ntoire-polus.ru

China
 +86 10 6787 3377 ext. 1020
 sales@ipgbeijing.com

France
 +33 (0) 388 674 974
 sales.france@ipgphotonics.com

India
 +91 80 2852 4861
 sales@ipgphotonics.in

Italy
 +39 0331 170 6900
 sales.italy@ipgphotonics.com

Japan
 +81 45 716 9831
 info@ipgphotonics.co.jp

Poland
 +48 32 721 22 20
 sales.poland@ipgphotonics.com

Singapore
 +65 62722663
 sales.singapore@ipgphotonics.com

South Korea
 +82 42 930 2000
 ipgk@ipgphotonics.com

Spain & Portugal
 +34 937 999 971
 sales.spain@ipgphotonics.com

Turkey
 +90 (216) 306 0317
 sales.turkey@ipgphotonics.com

United Kingdom
 +11 203 178 21 11
 sales.uk@ipgphotonics.com



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www.ipgphotonics.com • sales.us@ipgphotonics.com • 508.373-1100